SIBOGA-EXPEDITIE.

Siboga-Expeditie

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THE

CUMACEA OF THE SIBOGA EXPEDITION

BY

W. T. CALMAN, D.Sc.
British Museum (Natural History).

With 2 plates and 4 text-figures

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The collection of Cumacea obtained by the "Siboga" Expedition, although not very large, is of considerable interest and importance. Eleven species, all of which except one are regarded as new, are discussed below, while some eight additional species of which the material is considered insufficient for exact determination, are referred to under their respective genera. Several of the species are of exceptional size and of striking characters. One is referred to a new genus *(Pseudodiastylis)* which is in some respects intermediate between the families *Diastylidæ* and *Lampropidæ*; another *(Heterocuma Weberi)*, one of the largest Cumaceans hitherto described, is only provisionally referred to the genus *Heterocuma* and may ultimately require to be removed to a new genus; while a third *(Cyclaspis Sibogæ)* helps to diminish the narrow space separating the genera *Cyclaspis* and *Bodotria*. The discovery of a second species of *Paradiastylis* has revealed the existence of a somewhat remarkable difference between the sexes of this genus.

Our knowledge of Cumacea from extra-European seas is still so exceedingly fragmentary that it seems unnecessary to comment on the geographical relations of the species here described. No Cumacea have hitherto been recorded from the area traversed by the "Siboga". Two species, however, were obtained by the "Challenger" at Samboangan, Philippine Islands, and one of them, *Nannastacus suhmii*, has been identified in the present collection. The "Challenger" also dredged two species in Flinders Passage, between Australia and New Guinea, and one of these, *Cyclaspis exsculpta* Sars, is closely allied to the form described below under the name *C. persculpta*.

THE FOLLOWING IS A LIST OF THE STATIONS AT WHICH CUMACEA OCCURRED, WITH THE SPECIES OBTAINED AT EACH.

STATION 37. March 30—31. Sailus ketjil, Paternoster Islands. Plankton. *Bodotria* sp., *Nannastacus Hanseni, N. Suhmii, N. pardus, N. brachydactylus, N.* sp., *Cumella* sp.

STATION 40. April 2. Anchorage off Pulu Kawassang, Paternoster Islands. Plankton. *Nannastacus Suhmii, N. pardus, N.* sp., *Cumella* sp.

STATION 41. April 3. Between Paternoster and Postillion Islands. Plankton. *Bodotria* sp., *Nannastacus Hanseni, Cumella* sp.

STATION 93. July 25. Pulu Sanguisiapo, Tawi-Tawi Is. Sulu Archipelago. Plankton. *Paradiastylis longipes.*

STATION 142. August 5—7. Anchorage off Laiwui, coast of Obi Major. Townet. *Nannastacus* sp., *Campylaspis* sp., *Paradiastylis longipes.*

STATION 159. August 16. 0° 59′.1 S., 129° 48′.8 E. 411 metres. Coarse sand, Dredge. *Cyclaspis Sibogæ.*

STATION 164. August 20. 1° 42′.5 S., 130° 47′.5 E. 32 metres. Sand, small stones and shells, Dredge. *Cyclaspis persculpta, Nannastacus* sp., *Paradiastylis longipes.*

STATION 211. Sept. 25. 5° 40′.7 S., 120° 45′.5 E. 1158 metres. Coarse grey mud, superficial layer more liquid and brown. Deep-sea trawl. *Heterocuma Weberi, Bathycuma longirostris, Pseudodiastylis ferox, Diastylis cingulatus.*

STATION 221. Nov. 4. 6° 24′ S., 124° 39′ E. 2798 metres (Depth presumed to have increased to 3112 metres during the haul). Solid bluish grey mud with Foraminifera, covered by a 5 cm. thick layer of brown mud, uppermost layer of Foraminifera. Deep-sea trawl. *Diastylis cingulatus.*

STATION 241. Dec. 1. 4° 24′.3 S., 129° 49.3 E. 1570 metres. Dark sand with small stones. Blake dredge. *Diastylopsis* sp.

STATION 271. Dec. 21. 5° 46′.7 S., 134° 0′ E. 1788 metres. Bluish green mud of a uniform appearance. Deep sea trawl. *Cyclaspoides* sp. (in atrial cavity of an Ascidian).

Family Bodotriidæ.

Cyclaspis.

1. *Cyclaspis persculpta* n. sp. Plate I, figs. 1—3.

Description of Female with developing oostegites. Total length 11,25 mm., of which the carapace occupies about one third.

Resembling *C. exsculpta* Sars, in the general shape of the carapace, which is strongly sculptured with crests and hollows arranged in a manner comparable to that of the species named. The anterior transverse dorsal crest runs out on each side into a very prominent tooth. The greatest width of the carapace is measured across these teeth and is nearly $^3/_4$ of its length. The downward continuation of the ridge below this tooth meets a straight horizontal ridge which runs backwards forming the lower boundary of the "lateral depressed area" of Sars' description. The junction of the two ridges is elevated into another tooth, also indicated in *C. exsculpta*, marking the lower anterior corner of the area. The posterior transverse dorsal ridge is much further forward than in *C. exsculpta*, being only a little behind the middle of the length of the carapace. It is notched in the middle line and on each side it rises into a laminar tooth which is acute and curved at the tip into a hook, directed forwards and downwards. External to this tooth the ridge is continued obliquely downwards and forwards on each side to join the longitudinal ridge which separates the dorsal from the lateral depressed area, forming a tooth at the junction, from which a vertical ridge runs downward marking the posterior boundary of the lateral area. Owing to the forward position of the posterior transverse ridge and to the oblique direction of its lateral continuation, the lateral depressed area, which is more nearly quadrangular than in *C. exsculpta*, is much smaller and placed much further forward than in that species. Behind it, and nearly parallel to its posterior border, is a slightly curved ridge joining below a continuation of the lower horizontal ridge, and following it at about an equal distance is a still more oblique ridge which corresponds to the lateral one of the three dorsal keels in *C. exsculpta*. The median dorsal keel in the posterior half of the carapace is elevated and cristiform, divided into three rounded lobes. The ocular lobe is very long and narrow, reaching quite to the front of the pseudorostrum. The eye is without pigment and the corneal facets are very small. Their exact number could not be determined.

The last three thoracic somites have dorso-lateral ridges and the last two also a median dorsal ridge. The abdomen is a little longer than the cephalothoracic region. The first four somites have each a pair of strong dorso-lateral crests and their infero-lateral edges are marked

by less prominent but distinct ridges so that the transverse section is roughly quadrangular. In addition a median dorsal ridge is distinct on the first, less so on the succeeding somites. On the fifth somite the dorsal ridge again becomes prominent on its posterior half, and the dorso-lateral ridges, which occupy the usual position on the anterior part of the somite, run obliquely downwards and terminate on each side about the middle of the postero-lateral margin. Each of the first five abdominal somites articulates with the somite in front by a well-marked "peg-and-socket" articulation on each side. The last somite has well-marked median dorsal and lateral ridges, and has, on the dorsal surface, a transverse crescentic groove.

The texture of the integument is minutely and regularly reticulate and the surface of the carapace presents also a coarse but shallow pitting.

The first legs are longer by $^1/_3$ than the carapace, and have the terminal segments very slender. The basis is about $^2/_3$ the length of the succeeding segments together, the dactylus $^2/_3$ the length of the propodus and about equal to the carpus. The propodus bears three or four very long and slender setæ on its lower edge and the dactylus also carries marginal and terminal setæ.

The remaining pairs of legs do not differ greatly from those of *C. australis*, figured by SARS, except that the second pair are relatively shorter.

The uropods (Pl. I, fig. 3) are stout, the peduncle a little longer and the rami a little shorter than the last somite. The peduncle is obscurely serrated on the outer and more distinctly on the inner edge. The rami are of equal length, each tapering to a sharp point without any terminal spine. The endopod is serrated on both edges for rather more than half its length, the terminal portion being smooth. A spine on the inner margin marks the end of the serrated part and there is a second small spine a little way on the proximal side of the first. The exopod is obscurely serrated on both margins and is without spines or setæ.

Occurrence. Station 164, 32 metres. Two immature females.

Remarks. By its stongly sculptured carapace this very handsome species is at once distinguished from all the species of *Cyclaspis* hitherto described with the exception of *C. exsculpta* described by SARS from a fragmentary specimen obtained by the "Challenger" in 7 fathoms in Flinders Passage, between Australia and New Guinea. The Challenger specimen when complete cannot have been much more than $^1/_3$ the length of the larger of the "Siboga" specimens and it is just possible that the differences between them may be merely differences of growth. It is very improbable however that this is the case, the hooked teeth of the posterior transverse dorsal ridge, the small size and anterior position of the lateral depressed area, the presence of an additional oblique lateral ridge on the posterior part of the carapace and the trilobate posterior dorsal crest being characters which appear sufficient to define the present form as a distinct species.

2. *Cyclaspis Sibogæ* n. sp. Plate I, figs. 4—6.

Description of Female with developing oostegites. Total length 16,5 mm., of which the carapace occupies one quarter.

The carapace is sub-cylindrical, not elevated posteriorly, the transverse width equal to the vertical height and a little more than half the length. There is a median dorsal keel, less marked posteriorly. Crossing the dorsal surface are three strong transverse ridges the second of which is about the middle of the length of the carapace. The first runs nearly vertically downwards on the side of the carapace and is crossed near its lower end by the second, which curves forwards and reaches the margin of the carapace just below the antero-lateral tooth. The crossing of the two ridges forms a prominent obtuse tooth. The third ridge also curves forward laterally but dies out before reaching the second. The surface of the carapace is sunken between the ridges. A lower, rounded, longitudinal ridge runs between the first and second transverse ridges at the level of the fronto-lateral suture. The ocular lobe is long and narrow and extends quite to the tip of the pseudorostrum. No ocular elements were visible. The pseudorostrum is short and truncated, slightly up-turned, defined below by a narrow antennal notch and a prominent antero-lateral tooth which projects a little in front even of the pseudorostrum itself.

Four thoracic somites are distinct behind the carapace. The first of these is produced into a dorsal crest, rounded as seen from the side.

The abdomen is about $1^{1}/_{3}$ times the length of the cephalothoracic region and is rather stout, the diameter being a little more than $^{1}/_{3}$ of the height of the carapace. The somites are sub-cylindrical, with the lateral articular processes slightly developed, and with two longitudinal ridges on each side converging towards the posterior end of the somite. The last somite is unusually large, being but little shorter than the preceding.

The first pair of legs (Pl. I, fig. 6) are rather more than one-third longer than the carapace. The basis is longer than the remaining segments together and is not produced at its distal end. The carpus is little more than half the length of the propodus which is subequal to the dactylus. The remaining legs are of moderate length and rather slender. The ischium of the second pair is distinct.

The uropods are broken on both sides in the single specimen. The peduncle is slender and longer than the last somite.

Occurrence. Station 159, 411 metres. 1 specimen.

Remarks. This species is distinguished from all the other members of the genus by the small size of the carapace and the elongation of the abdomen. As the inflated carapace is almost the only definite character distinguishing the genus *Cyclaspis* from *Bodotria*, the species might perhaps equally well have been referred to the latter genus. The sculpturing of the carapace, however, is unlike that of any species of *Bodotria*, where a lateral longitudinal keel is one of the most constant features, and on that account I refer the species provisionally to the genus *Cyclaspis*.

Bodotria.

1. *Bodotria* sp.

Two male specimens of this genus appear to belong to a species which is represented

by a series of both sexes from the Gulf of Siam in the collection of the Copenhagen Museum and which I propose to describe elsewhere. It is very closely allied to *B. arenosa* Goodsir.

Occurrence. Station 37. Plankton. One specimen.
Station 41. Plankton. One specimen.

Cyclaspoides.

1. *Cyclaspoides* sp.

A single adult male specimen belonging to this genus was discovered by Prof. SLUITER in the atrial cavity of a species of Tunicate from Station 271, 1788 metres. The specimen is considerably damaged but it resembles very closely *C. Sarsi* of BONNIER (Ann. Univ. Lyon XXVI, Campagne du "Caudan", p. 530). As the adult male of that species has not yet been described it seems inadvisable to venture on a more precise determination of the present specimen since the characters in which it differs from the females and immature males of *C. sarsi* might possibly be sexual differences. The most obvious of these is the greater length of the uropods which considerably exceed the length of the last somite.

The occurrence of the specimen in the atrial cavity of a Tunicate may have been accidental. It has the appearance of having suffered partial digestion, the greater part of the soft tissues having disappeared.

Family VAUNTOMPSONIIDÆ.

Heterocuma.

1. *Heterocuma* (?) *Weberi* n. sp. Plate I, figs. 7—12.

Description of Male. Total length 28,6 mm.

The general form is elongated and slender. The carapace is small, scarcely one-fifth of the total length, its vertical height a little less and its transverse width a little more than one-half its length. Seen from above it is oval in shape, not much narrowed in front nor behind and with the greatest width a little in front of the middle. The posterior half of the dorsal surface is rounded from side to side but the anterior half is raised into a prominent crest, the outline of which is convex with a slight concavity at the base of the ocular lobe. Pseudorostrum very short, slightly upturned and bluntly rounded as seen from the side. Antero-lateral margin slightly concave without any distinct antennal notch. Antero-lateral angle obtuse. The ocular lobe long and narrow, reaching quite to the extremity of the pseudorostrum, slightly expanded distally, where two large but indistinctly defined corneal areas can be made out. There is no ocular pigment. The surface of the carapace anteriorly is beset with minute spiniform points turned forwards; posteriorly, it is smooth.

The thoracic somites diminish very gradually in width and in vertical height from before backwards and the anterior abdominal somites are but little lower and narrower than the posterior part of the carapace. The first leg-bearing somite is well exposed, though short. The

pleural plates of the fourth somite are produced anteriorly on each side into a narrow rounded lobe defined above by a deep notch. The last three thoracic somites are ornamented with longitudinal ridges similar to but less distinct than those to be described on the abdominal somites.

The abdomen is longer by nearly two-thirds than the cephalothoracic region and the anterior somites are as broad as and a little deeper than the posterior thoracic somites. Each somite has three pairs of longitudinal ridges on its surface, one pair dorsal, one dorso-lateral, and one lateral. These ridges are not very prominent; the lateral pair are low and rounded and do not reach to the posterior end of the somite. On the fifth somite, which is longer by one-third than the preceding, the lateral ridge unites with the dorso-lateral at about the middle of the somite. The last somite, which is about as long as the fourth, is somewhat depressed, with well marked lateral ridges and a pair of slightly marked longitudinal ridges close together on the anterior part of the dorsal surface. The supra-anal lobe lying between the bases of the uropods is nearly square and its surface is raised into a prominent rounded eminence. Just in front of this the dorsal surface of the somite is crossed by a crescentic groove with the ends turned forwards.

The antennules are of moderate length, the first and third segments of the peduncle longer than the second. The external flagellum (Pl. I, fig. 9) is nearly one half the length of the last segment of the peduncle and is composed of three segments of which the second and third are very small; the first is swollen at the base on the lower and inner side, where it bears a tuft of very long sensory filaments. The internal flagellum has a somewhat unusual form. It is composed of two segments, the proximal forming a nearly hemispherical cushion half as broad as the last segment of the peduncle and carrying a dense brush of fine, rather stiff, sensory filaments, much shorter than those on the external flagellum; the second segment is narrow, not more than $^1/_5$ the thickness of the first and about as long, bearing three short setæ.

The antenna is about as long as the body. The sensory hairs on the anterior surface of the peduncle are less numerous than usual. The flagellum is composed of numerous short segments. About the middle of its length they are but little longer than broad. At the tip however they are long and slender.

The third maxilliped (Pl. I, fig. 10) has a long und slender basis, two and a half times as long as the remaining segments and nearly twice as long as the exopod. Its outer and inner margins are clothed with numerous plumose setæ and its distal outer angle is produced into a large rounded lobe which extends beyond the merus. The merus is slightly expanded externally where it bears several teeth. The carpus is toothed on its inner edge. The propodus is narrow and subequal to the dactylus.

The first legs (Pl. I, fig. 11) are nearly twice as long as the carapace. The basis is slender, not quite two-thirds the length of the remaining segments, and about $1^1/_2$ times the length of the exopod, having plumose setæ on both margins and a series of spines on the inner margin, with a longer stout spine at the distal end. The short ischium has a stout tooth internally. The merus is a little shorter than the carpus which is finely serrated on the outer and inner edges. The propodus is slender, twice as long as the carpus, and a little longer than the still more slender dactylus.

The second and third legs carry well developed exopods, that of the second equal in size to the exopod of the first leg, while that of the third is slightly smaller. The fourth and fifth legs are without any trace of exopods.

The second legs have the basis about four-fifths the length of the remaining segments. The ischium is distinct though very short. The carpus is a little longer than the merus and bears at its distal end a group of long and stout spines. The dactylus is half as long again as the carpus, rather slender, and well armed with lateral and terminal spines. The three posterior legs diminish successively in length. The third pair have the basis longer than the remaining segments together, while in the fifth pair it is only about $^2/_3$ of that length. The carpus is in each case a little longer than the merus. The legs are abundantly beset with plumose hairs and the carpus bears distally a group of stout flexible annulated setæ.

The pleopods are large and well provided with natatory setæ. The rami of the first pair are about two-thirds the length of the peduncle.

The uropods (Pl. I, fig. 12) are long and slender. The peduncle is more than $1^1/_2$ times the length of the last somite and is beset on its inner edge with numerous short spinules and a few setæ. The exopod is nearly two thirds the length of the peduncle, the endopod a little shorter. The first segment of the endopod is longer by one half than the second; the inner margins of both segments are beset with numerous slender spinules of unequal length and the outer margins of both carry series of short setæ; the terminal spine is very slender. The first segment of the exopod is about two-thirds the length of the second, measured along the outer edge. The inner margin of the first and both margins of the second segment are clothed with setæ.

Occurrence. Station 211, 1158 metres. 1 specimen.

Remarks. This species adds another to the somewhat puzzling group of forms which appear to establish a transition between the *Bodotriidæ* and *Vauntompsoniidæ*. MIERS defines his genus *Heterocuma* (P. Zool. Soc. London, 1879, p. 57) as having the "first three pairs of legs palpigerous in both sexes" but the figure of the male which accompanies his paper shows exopods on all the legs. Without commenting on this discrepancy. STEBBING (Hist. Crust. p. 304) refers the genus to the *Vanntompsoniidæ*, defining the family as having, in the male sex, "well-developed swimming-branches" on the first four legs. On examining the type-specimens of *H. Sarsi*, I find that (as HANSEN appears to suspect, Isop. Cumac. Plankton Exp. p. 56). MIERS' text was right and his figure wrong in this respect, the male resembling the female in having exopods on the first three legs only. Those on the second and third legs are, as described in the female by HANSEN, quite small, unsegmented rods, without flagellum. In the number and character of the exopods present in both sexes therefore *Heterocuma Sarsi* agrees with the genus *Cumopsis*, which is referred to the *Bodotriidæ*, and it appears to differ from that genus mainly in the form of the third maxillipeds, which have the basis and merus produced externally into pointed lobes and the carpus expanded internally. The species now described agrees with *Heterocuma Sarsi* in having, in the male sex, the last two legs without

exopods, and in having the basis of the third maxillipeds strongly produced. On these grounds it is referred, provisionally, to the same genus. It differs considerably from *H. Sarsi* however in the fact that the exopods of the second and third legs are well developed and hardly smaller than that of the first leg, and also in the form of the merus and carpus of the third maxilliped, the former being scarcely produced externally and the latter not broadened.

The species takes a place among the largest known Cumacea. In length of body it appears to be excelled only by the Arctic *Diastylis goodsiri*, which sometimes reaches a length of 35 mm.

Bathycuma.

1. *Bathycuma longirostris* n. sp. Plate II, figs. 13 and 14.

Description of immature Male. Total length 12 mm.

Carapace a little more than one-fourth of the total length, compressed, its transverse width little more than one third and its vertical height less than one half its length. The dorsal edge is sharply keeled and moderately convex as seen from the side; its anterior half is cut into a double row of alternating teeth. The pseudorostrum is long, about one-fifth of the length of the carapace, horizontal and acutely pointed. There is no eye and the ocular lobe is represented by a narrow wedge-shaped process lying between the lateral plates of the pseudorostrum. The antero-lateral margin is deeply concave, forming a nearly semicircular antennal notch. The antero-lateral angle is acute and just behind it the lower margin is obscurely serrated. The posteror margin is vertical. The fourth leg-bearing somite has the pleural plates produced anteriorly on each side into a narrow rounded lobe carrying a single seta. The abdomen is a little over half the total length, rather stout, and quite smooth. The last somite has a large supra-anal lobe, with a convex hinder margin.

The antennules have last segment of the peduncle slightly swollen, the outer flagellum composed of two segments of which the first is twice as long as the second, and the inner flagellum very short, also two-segmented, with the second segment very minute.

The mandibles (seen by transparency through the carapace) have a normally elongated body, not abbreviated as in the *Leuconidæ*.

The third maxillipeds have the basis produced distally in a large lobe which reaches to the distal end of the merus and has a strongly serrated edge beset with long plumose setæ. There a few teeth distally on the lower surface of the basis.

The first legs exceed by about one-third the length of the carapace. The basis is strongly denticulated on its lower surface near the outer edge. The distal segments are very slender the dactylus a little shorter than the propodus and longer than the carpus.

The second legs have the ischium distinctly defined but very short; the distal segments are armed with stout spines and the dactylus is long and slender. The exopod of the third pair is equal in size to that of the second and a little smaller than that of the first pair. The fourth pair of legs are sub-equal in length to the third pair but the exopod is little more than half the size of that on the third pair and bears only a few very short setæ at the tip. The last pair of legs are distinctly shorter than the preceding.

The pleopods are nearly fully formed but their rami bear only a few very short setæ.

The peduncle of the uropods (Pl. II, fig. 14) is about equal in length to the last somite and bears about seven long and six short spines internally. The exopod is about two-thirds the length of the peduncle, rather broad, the proximal segment about $^2/_5$ the length of the distal along the outer margin. There are some short spinules along the outer edge and long setæ on the inner edge and at the tip.

The endopod is a very little shorter than the exopod, its proximal a little longer than its distal segment and much stouter. On the inner edge of the proximal segment are nine spines, the distal one rather long. The distal segment has eight short spines internally and three longer ones at the tip.

Occurrence. Station 211, 1158 metres. 1 specimen.

Remarks. The specimen described above agrees with the genus *Bathycuma* in possessing exopods on all except the last thoracic legs, the basis of the third maxilliped strongly produced distally, and a serrated dorsal crest with a double row of alternating teeth on the carapace.

Comparing it with the summary which I have given elsewhere (Fisheries, Ireland, Sci. Invest., 1904, I, (1905) p. 18) of the characters of the two species already known, *B. elongata* Hansen, and *B. brevirostris* (Norman), the following appear to be the chief diagnostic features of the new species: — Carapace more than twice as long as deep; pseudorostrum one-fifth of length of carapace, its upper margin horizontal, without serrations; basis of third maxillipeds with a few teeth; second legs with ischium distinct; peduncle of uropods longer by one-half than the subequal rami.

Family Nannastacidae.

Nannastacus.

Although only a small number of species belonging to this genus have been described hitherto, the Siboga collections and others which are now in course of examination indicate that the genus plays an important part in tropical seas, and that, in the plankton of inshore waters, the numbers of individuals and of species are often considerable. As a rule however, only the males are obtained in this way, the females haunting the bottom and being more rarely captured by the townet. Many of the species are apparently very closely allied, and only to be discriminated with difficulty at least in the absence of females. It is on this account that I have not ventured to determine more than a part of the Siboga material of this genus. In addition to the species named below, representatives of at least four others were obtained the consideration of which may be deferred until further material from the neighbouring regions has been worked through.

1. *Nannastacus Hanseni* n. sp. (Text-fig. 1, *a*—*e*).

Description of adult Male. Total length 1,5 mm.

Carapace about two-fifths of total length, broader than deep, dorsal surface depressed in the middle line between the swollen branchial regions and elevated posteriorly into a bilobed prominence which overhangs the succeeding somites. Pseudorostrum, seen from the side, horizontal, truncate. Antero-lateral angle slightly produced forwards, bluntly pointed and obscurely serrate. Seen from above the pseudorostral plates do not meet either above or below the respiratory channel. The eyes are large, each with three hemispherical corneal lenses. The surface of the carapace, especially on the dorsal side, is beset with low, rounded tubercles. Laterally these pass into smaller granulations and near the lower margin the surface is rugose.

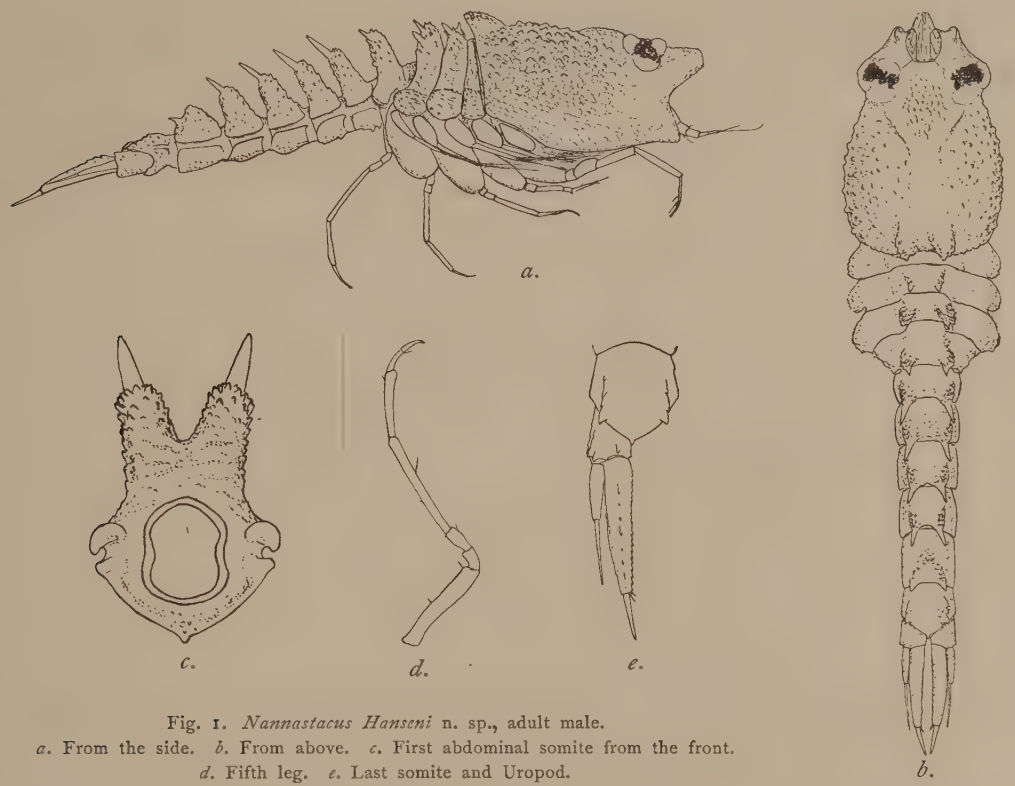

Fig. 1. *Nannastacus Hanseni* n. sp., adult male.
a. From the side. *b*. From above. *c*. First abdominal somite from the front.
d. Fifth leg. *e*. Last somite and Uropod.

The first leg-bearing somite is very short and hardly visible from the exterior. The last three thoracic somites have each on the dorsal surface a pair of prominences beset with tubercles and spines. These prominences are largest on the last somite where they resemble the prominences of the abdominal somites. The pleural plates of the leg-bearing somites are slightly expanded and the whole surface is roughened with granules.

The abdomen is little more than $^3/_4$ of the length of the cephalothoracic region and the fifth somite is hardly longer than the preceding. The first four somites each bear on the dorsal surface a pair of stout sub-cylindrical processes, beset with tubercles, and terminating each in a stout spine (text-fig. 1 *c*.). The height of the processes of the anterior somites, measured to

the tip of the apical spine, is considerably greater than the vertical depth of the somites themselves. On the fifth somite the processes are much lower and of different form, with a prominent spine on the posterior margin. The lateral groove on the abdominal somites is well developed. The lateral crests overhanging it are prominent and obscurely serrated.

The antennae have the peduncle a little stouter than in *N. unguiculatus*. The proportions of the legs differ very little from those of the species named.

Uropods, (text-fig. 1 *e*.) excluding the apical spines, about equal in length to the last two somites together. Peduncle very short, its outer margin about $^2/_5$ the length of the endopod which is finely serrated internally and has an apical spine about $^1/_3$ of its own length. Exopod nearly half the length of endopod, its basal segment nearly concealed, apical spine about equal in length to the ramus.

Occurrence. Station 37. Several specimens. Station 41. Plankton. One specimen.

Remarks. This peculiar form is distinguished from all the known species by the remarkable armature of the abdominal somites. A somewhat similar armature, though less strongly developed, is found in *N. ossiani* Stebbing, but that species appears to be distinguished by having, among other characters, the pseudorostrum turned upwards and marked by concentric ridges, the surface of the carapace smoother, without the bilobed dorsal process posteriorly and the last two thoracic somites with a median dorsal prominence. The species was first detected by Dr. H. J. Hansen who found it, with several of the other species discussed in the present Report, in examining plankton material for Schizopoda and when forwarding the specimens to me remarked on the peculiar characters which they presented.

2. *Nannastacus suhmii* Sars.

Nannastacus suhmii G. O. Sars, Rep. Challenger Cumacea, p. 63, pl. X, figs. 4 and 5.

I refer to this species, not without some hesitation, a considerable number of male specimens which agree in general characters with the type-specimens in the Challenger collection. I have previously pointed out (Herdman's Rep. Ceylon Pearl Fisheries, Royal Society, Pt. II, p. 177, 1904) that Sars' figure of the male is incorrect as regards the antero-lateral angle of the carapace. In the type specimens this is not produced but forms nearly a right angle, broadly rounded off at the apex. In the Siboga specimens it is still more rounded and is armed with a single curved tooth which I cannot find in the type-specimens. The uropods are almost exactly one-quarter of the length of the body in the Siboga specimens while in the types the proportion is distinctly less. In the Siboga specimens the terminal spine of the exopod of the uropods extends beyond the middle of the endopod. In the types it is much shorter, hardly exceeding one-quarter of the length of the uropods. Finally the Siboga specimens reach a length of 2,6 mm. while the type specimens are about 1,9 mm. long.

Stebbing's *N. georgi* (Willey's Zool. Results, Pt. V, p. 613, pl. LXIV *B*) so far as can be gathered from his description and figures, agrees very closely with the present specimens. The only difference of importance is that the last thoracic and first abdominal somites are stated

to have a "marked longitudinal medio-dorsal depression". In the Siboga specimens these somites are flattened on the dorsal surface but not distinctly hollowed.

Occurrence. Stations 37 and 40. Plankton. Many specimens.

Distribution. Samboangan, Philippine Islands, surface (SARS); Blanche Bay, New Britain, surface (STEBBING).

3. *Nannastacus pardus* n. sp. (Text-fig. 2, *a*—*c*).

Description of adult Male. Total length 1,7 mm.

Carapace one-third of total length, subcylindrical, dorsal surface slightly depressed between the branchial regions. Pseudorostrum very short, upturned and rounded. Antero-lateral angle rounded, projecting forwards to a level with the short pseudorostrum, armed with a single curved tooth on its outer surface. The pseudorostral plates do not meet in front of the cephalic lobe. The eyes are very large and darkly pigmented, each with three hemispherical corneal lenses. The surface of the carapace is smooth, without tubercles or spines.

Fig. 2. *Nannastacus pardus* n. sp., adult male.
a. From the side, appendages omitted. *b*. Fifth leg. *c*. Last somite and Uropod.

The pleural plates of the free thoracic somites are expanded laterally and the somites are unarmed and rounded on the dorsal surface.

The abdomen is very stout, about equal in length to the cephalothoracic region. The first four somites are about as broad as long and the first five have a well-marked lateral groove. The terminal somite is but little shorter than the preceding, bluntly pointed posteriorly and with the anterior margin thickened and everted, especially at the sides. The abdominal somites, especially the last two, are beset on the dorsal surface with short setæ.

The antennules and the anterior legs do not differ materially in their proportions from those of *N. unguiculatus* but the posterior legs are relatively longer. The last pair (text-fig. 2 *b*.) are about two-fifths of the total length of the body and very slender. The carpus is about equal in length to the basis and longer by one half than the propodus. The dactylus and its slender curved claw are together a little shorter than the propodus.

The uropods (text-fig. 2 *c*.) are (excluding the terminal spines) about twice as long as the last somite. The peduncle measures, along its outer margin, about one-third of the endopod, and the exopod about one-quarter. The endopod has two spines internal to the base of the terminal spine, but none on the inner edge which is rather coarsely serrated. The terminal spines are slender, that of the exopod reaching to the end of the endopod and the spine of the latter is at least half as long as the ramus which bears it.

The pigmentation of this species is peculiar and characteristic. The greater part of the carapace is covered by large black chromatophores, arranged as shown in the figure and there are numerous, more deeply seated chromatophores in the posterior thoracic and abdominal regions.

Occurrence. Station 37. Two males. Station 40. One male.

Remarks. This species is allied to *N. suhmii* with which it agrees in the absence of crests or prominences on the abdominal somites. It differs from that species in the shorter abdomen, the much shorter uropods, the much longer last pair of legs as well as in the characteristic colouration.

4. *Nannastacus brachydactylus* n. sp. (Text-fig. 3, *a*—*e*).

Description of adult Male. Total length 1,6 mm.

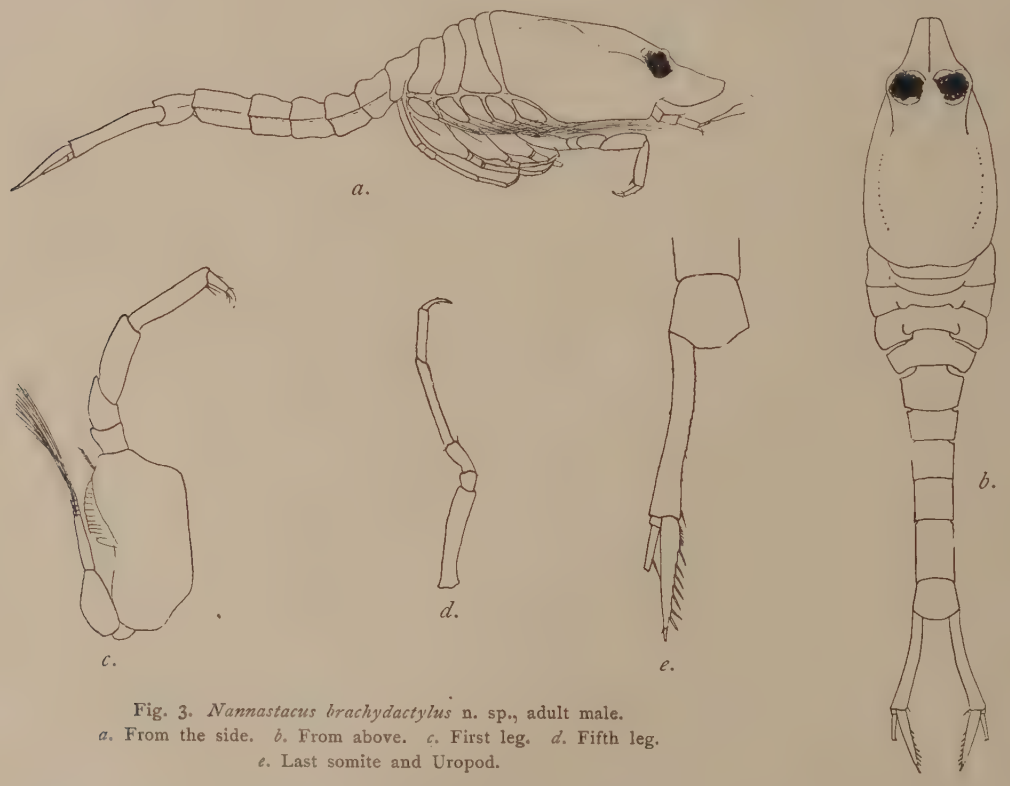

Fig. 3. *Nannastacus brachydactylus* n. sp., adult male.
a. From the side. *b*. From above. *c*. First leg. *d*. Fifth leg.
e. Last somite and Uropod.

Carapace about two-fifths of total length, somewhat depressed and not quite twice as long as broad. The dorsal surface is flattened posteriorly, sloping downwards towards the eyes

anteriorly, and the branchial regions are slightly swollen. The rostrum is prominent, the lateral plates meeting in front of the cephalic lobe for nearly one quarter of the total length of the carapace. Its dorsal surface slopes a little downwards and the tip is truncate as seen from above, rounded below as seen from the side. There is no distinct antennal notch and the very short antero-lateral margin of the carapace meets the lower margin nearly at right angles. The eyes are set near together and are very large and darkly pigmented, each with three large corneal lenses. The surface of the carapace is smooth, without tubercles or teeth and without any conspicuous hairs.

The five leg-bearing thoracic somites are all distinct. The pleural plates of all except the first are expanded laterally. The abdomen is a little less than three-fourths of the length of the cephalothoracic region and its somites have well-marked lateral grooves.

The appendages, so far as examined, are closely similar to those of *H. longirostris* with the exception of the first legs (text-fig. 3*c*.) which are very stout. The propodus is hardly narrower than the carpus and the dactylus is less than one third of the length of the propodus and bears a very short stout curved claw.

The uropods (text-fig. 3*e*.) have the peduncle two and a half times the length of the last somite and little more than one and a half times the length of the endopod. The latter carries seven spines on its inner edge and has a short terminal spine. The exopod is broken on both sides of the single specimen.

Occurrence. Station 37. Plankton. One specimen.

Remarks. This species is allied to *N. longirostris* Sars, but is at once distinguished from that species by the much shorter pseudorostrum and by the very different structure of the first pair of legs. *N. hirsutus* Hansen, (Isop. Cumac. Plankton Exp. 1895, p. 59, pl. III, figs. 3, 3*b*), is also allied but is distinguished by the hairy and much deeper carapace, shorter pseudorostrum, shorter uropods, slender first legs and other characters. The three species together stand somewhat apart from the other numbers of the genus and may perhaps be found to deserve generic separation.

Nannastacus spp.

Specimens of this genus, belonging to several probably new species which, for reasons given above cannot at present be described, occurred at Stations 37, 40, 142 and 164.

Cumella.

Cumella spp.

The remarks made above as to the genus *Nannastacus* apply with equal force to the present genus, and I therefore refrain for the present from describing five male specimens representing apparently two new species, obtained at stations 37, 40 and 41.

Campylaspis.

Campylaspis sp.

A solitary and very young male specimen belonging to this genus was obtained at Station 142. It resembles very closely *C. sulcata* Sars, from which it differs in no conspicuous character except size. Its length is about 1,2 mm. while specimens of *C. sulcata* at approximately the same stage of development measure 1,9 mm. On account of its immaturity however I hesitate to identify the specimen with *C. sulcata* which is at present only known from the North Atlantic und Mediterranean.

Family Diastylidæ.

Pseudodiastylis nov. gen.

Carapace inflated, with long pseudorostrum. Telson with three terminal spines. Outer ramus of antennules very long and stout, of five segments, inner vestigial, of three segments. Third maxillipeds closely resembling first pair of legs. Third and fourth pairs of legs with vestigial exopods in female.

1. *Pseudodiastylis ferox* n. sp. Plate II, figs. 15—25.

Description of Female with very small oostegites. Total length 14 mm.

The carapace, including the long pseudorostrum, is two-fifths of the total length. It is somewhat inflated, oval in outline as seen from above, the greatest width at a little behind the middle being about three-sevenths of its length and a little greater than its height. Seen from the side the dorsal outline is strongly arched. The pseudorostrum is very long, directed obliquely upwards, with a slight downward curvature, and pointed at the tip. There is no eye and the ocular lobe is represented by a very small vestige in front of which the pseudorostral plates meet for about one-third of the total length of the carapace. The antennal notch is hardly indicated and the slightly produced antero-lateral corner is tipped with several spines (Pl. II, fig. 17). Anteriorly the lower margin bears a few spines. The whole surface of the carapace is spinose, most of the larger spines being compound and of a peculiar form. Each consists (Pl. II, fig. 18) of a rather stout cylindrical pedicel of varying length from the truncated top of which a number of secondary spines radiate nearly at right angles to its axis. In the centre of the top of the pedicel is implanted a single seta. On the dorsal surface of the carapace anteriorly these compound spines are most fully developed (Pl. II, fig. 18*a*), the pedicels being long, about five times as long as thick, beset with scattered granulations and carrying from five to eight radiating spines which, though mostly broken off in the specimen examined, are sometimes very long and slender. Towards the posterior part of the dorsal surface and towards the lower edge the spines rapidly decrease in size and complexity (Pl. II, fig. 18*b* and *c*). The

peduncle especially becomes very short and the radiating spines reduced in number. The side of the carapace is crossed by a diagonal line of close-set simple spinules running backwards and upwards from the antero-lateral corner, near which its spinules become long and slender. Below this line none of the above described compound spines are found, their place being taken by scattered simple spines. A little way above the lower margin is a horizontal but slightly sinuous serrated ridge which near the antero-lateral corner becomes broken up into a row of spines. Between the spines above described the whole surface of the carapace is beset with minute spiniform points regularly disposed and rather widely spaced. On the rostrum these minute spinules are more numerous and closely set.

The free thoracic somites diminish rapidly in height and in width in passing backwards. The first is very short but completely exposed. The line of separation between the second and third is not very strongly marked, suggesting that these two somites are immovably united. All the somites have the surface beset with spiniform points with small spines scattered among them.

The abdomen is slender and, including the long telson, a little longer than the cephalo-thoracic region. The somites are subcylindrical and beset with small spines and spiniform points. The telson (Pl. II, fig. 25), including its terminal spine, is about five times the length of the last somite and nearly as long as the last three somites together. Except close to the base, where it widens a little and where the anus is situated, the telson is narrow, nearly 20 times as long as broad, and the sub-parallel sides of the post-anal part are strongly dentated for the greater part of their length. Near the distal end are three pairs of lateral spines and the tip bears three spines, the median one twice as long as the other two and about one-sixth of the total length of the telson.

The antennules (Pl. II, fig. 19) are remarkably long and stout, almost pediform in appearance, about $^3/_4$ of the length of the carapace. The first segment of the peduncle is equal in length to the other two, which are subequal. The external flagellum is $^4/_7$ of the length of the peduncle and is very stout. It is composed of five segments, the terminal one being very minute. The third and fourth segments are subequal, together equal in length to the first and each a little longer than the second. The inner flagellum (Pl. II, fig. 19*a*) is very minute, hardly one sixth as long as the first segment of the outer flagellum. It is composed of three segments, the first and second subequal and the last minute. The segments of the peduncle and of the outer flagellum are closely beset with minute spiniform granules among which on the proximal segment are a few longer spines.

The antenna (Pl. II, fig. 17) could not be fully seen without dissection but it possesses a long, styliform terminal segment the lower edge of which and of the only other segment which is visible carries a few small spines.

The third maxillipeds (Pl. II, fig. 20) are more pediform than in any other Cumacean known to me. The basis is one-half the length of the limb, narrowing gradually towards the distal end with the outer angle not at all produced but bearing several very long plumosè setæ; the inner margin is minutely serrated distally. The ischium is very short, the merus is produced and rounded externally. The carpus is nearly as long as the next two segments together. The

outer margin is serrated near the base and the inner margin bears a series of about 10 strong spiniform teeth. The propodus is a little more slender than the carpus and the dactylus is much more slender and $^3/_4$ the length of the propodus. It bears a long slender curved terminal spine and several setæ on the inner margin. All the other segments of the limb carry long plumose hairs. The exopod is a little shorter than the basis. The proximal segment of the exopod and all the segments of the endopod except the dactylus have the surface roughened with closely set sharp points becoming squamiform in some places and spiniform in others.

The first legs (Pl. II, Fig. 21) are $^5/_6$ of the total length of the carapace and a little longer than the third maxillipeds from which they differ little in the proportions and shape of their segments. The basis is a little more slender distally and does not bear any very long setæ at its distal end. The merus is not produced externally. The carpus is dentated on the inner edge but the teeth are not so large and spiniform as on the maxilliped. The dactylus is about $^2/_3$ the length of the propodus.

The second legs (Pl. II, fig. 22) are long and rather slender. The basis is a little more than two thirds the length of the remaining segments together. The ischium is distinct though short. The carpus is longer than the propodus and dactylus together. It bears a series of seven long and slender spines on its inner edge and a single spine on its outer edge. The propodus is half as long as the dactylus which is slender and has a long and very slender apical spine.

The remaining pairs of legs diminish successively in length, the fifth (Pl. II, fig. 24) being four-sevenths the length of the second pair. The third (Pl. II, fig. 23) and fourth pairs carry a very minute vestige of the exopodite consisting of two segments tipped with a few setæ (fig. 23*a*). In the second pair the basis is longer by one-third than the remaining segments together, in the fifth pair it is only two-thirds of that length. On all the legs the surface, especially of the proximal segments, is rough with close-set granules.

The uropods are long and slender. The peduncle is longer by one quarter than the telson and is beset with minute granules which appear as serrations on its outer edge. The inner edge bears seven or eight small spines on its distal half. Both rami are broken in the single specimen but their basal portions show them to have been rather long and slender and armed with slender spines.

Occurrence. Station 211, 1158 metres. 1 specimen.

Remarks. As I did not wish to dismember completely the solitary specimen of this remarkable form I am unable to give details as to the structure of the mouth-parts which might have thrown light upon its systematic position. In the general form of the body, the large and tumid carapace, the well-marked pseudorostrum, the slender abdomen, the narrow telson, and the long and slender uropods it agrees with most of the *Diastylidæ*. It differs from that family hoewever in possessing three instead of two terminal spines on the telson. In this respect it agrees better with the *Lampropidæ*, a family which, notwithstanding the considerable differences of general form, appears in most other characters to be not distantly related to the *Diastylidæ*.

The styliform terminal segment of the antenna is another small character in which the present form approaches the *Lampropidæ*, especially the genus *Paralamprops*. In that family, on the other hand, the flagella of the antennule do not as a rule differ greatly in length. On these grounds, and notwithstanding the incompleteness of the account which I am able to give of this new species, I have found it necessary to establish for it a new genus, placing it for the present among the *Diastylidae* on the ground of its similarity to them in general form. From all the described genera of the family it is separated by having three terminal spines on the telson. Should it prove necessary, in the future, to transfer it to the *Lampropidæ*, the genus will still be sufficiently distinguished by its inflated carapace and large pseudorostrum. Other characters which may prove to be of generic value are the great size of the outer ramus of the antennule, and the pediform third maxillipeds, while the remarkable spinous armature of the carapace distinguishes the species at once from all Cumacea hitherto described.

Diastylis.

1. *Diastylis cingulatus* n. sp. Plate II, figs. 26—29.

Description of young Male. Total length 15 mm.

The carapace is sub-globose, $^2/_7$ of the total length, its transverse width a little more than three-quarters, and its vertical height about two-thirds, of its length. It is encircled by a stout ridge which crosses the dorsal surface a little behind the middle and inclines a little forward on each side. The pseudorostrum is long, horizontal and rather sharply pointed, the pseudorostral plates meeting for about one fifth of the length of the carapace. There is no eye and no ocular lobe. The strongly curved lower margin of the carapace runs obliquely upwards into the lower edge of the rostrum without any distinct antero-lateral angle or antennal notch. The whole surface of the carapace is beset with spines which, in the specimen figured, are nearly all broken off close to the base. The encircling ridge bears the stumps of a series of stout spines closely set throughout its whole length. In front of the ridge the spines are smaller and more closely set than behind it and most of those which remain unbroken are hook-shaped, with the distal part roughened with small tubercles (Pl. II, fig. 28). On each side of the anterior part of the carapace is set a single stout, straight and smooth spine a little longer than the uncinate spines surrounding it. Behind the ridge, the spines are short, stout and conical. On the upper surface of the pseudorostrum, close to the tip, are the bases of a pair of rather stout spines. The lower margin of the carapace bears throughout its length a close-set series of spines which posteriorly are short and very thick but anteriorly become long and slender.

The first leg-bearing somite is exposed dorsally but is covered at the sides by the second. The third and fourth are fused together, and their pleural plates are not expanded. The lateral processes of the last thoracic somite are not produced, and the articulation of the legs is displaced towards the dorsal surface.

The abdomen is rather slender and, including the telson, about one-third longer than the cephalothoracic region. All the somites as well as those of the thorax, are beset with small

spines. The telson (Pl. II, fig. 29) is about one-fifth of the total length of the body and a little more than three times the length of the last somite; the anus is situated about one quarter of the length of the telson from its apex. The pre-anal portion is cylindrical, of nearly equal diameter throughout, with a slight downward curvature. The post-anal portion, as seen from above, is triangular with nearly straight sides and is deflexed. The tip bears two very small spinules and immediately behind them a pair of small setæ. Near the base of the telson on each side is a series of minute teeth.

The antennules are more than $^1/_3$ the length of the carapace; the second segment of the peduncle is longer than the third.

The basis of the first legs (which are broken off in both the specimens) has a row of stout spines on the lower surface with a pair of large spines close to the distal end.

The second and following pairs of legs are beset with spines which are most conspicuous on the basal segments. The third and fourth are hardly shorter than the second and have the merus nearly three times as long as the carpus. The fifth pair are about $^2/_3$ the length of the preceding and have the merus and carpus subequal. The uropods (Pl. II, fig. 29) are slender, the peduncle five sixths the length of the telson, with a few spinules on the distal half of its inner margin. The endopod is a little less than half the length of the peduncle; the first segment is longer than the other two together. The exopod reaches to the end of the second segment. Both exopod and endopod carry on their inner edges long and slender spines or stout setæ with a group of the same at the tips, and the outer edge of the exopod has also apparently been provided with setæ.

A second male specimen is represented only by a much damaged carapace, considerably larger than that described above, though still immature, to judge from the short, thick and imperfectly segmented flagellum of the antenna. In this specimen the encircling ridge of the carapace is not margined with spines. In front of the ridge the spines on the surface of the carapace are relatively smaller than in the above described specimen and are nearly all unciform, but on each side are two oblique rows each of three or four large smooth spines.

Occurrence. Stations 211, 1158 metres and 221, 2798 metres. One specimen each.

Remarks. The species described above belongs, with such species as *D. longipes* Sars, *D. josephinæ* Sars and *D. erinaceus* Sars, to a section of the genus characterised by having the pre-anal portion of the telson much longer than the post-anal. From these as well as from all other species of the genus it is distinguished by the encircling ridge of the carapace and by the peculiar uncinate spines described above.

Paradiastylis.

This genus was established for the reception of a species from Ceylon, *P. brachyura*, (Calman in Herdman's Rep. Ceylon Pearl Fisheries, Royal Society, Pt. II, p. 173, 1904) of which the type specimens differed remarkably from all known *Cumacea* in having no exopod

on the third maxillipeds. The present collection includes numerous specimens of a new species which show the no less remarkable fact that this character is peculiar to the female sex. The adult males have large exopods on these limbs. On re-examining the type specimens of *P. brachyura*, I find that the young males possess a developing exopod which is not visible without dissection and was therefore overlooked in the original account of the species.

1. *Paradiastylis longipes* n. sp. (Text-fig. 4, *a*—*i*.).

Description of adult Female. Total length 3,0 mm. (Text-fig. 4*a*).

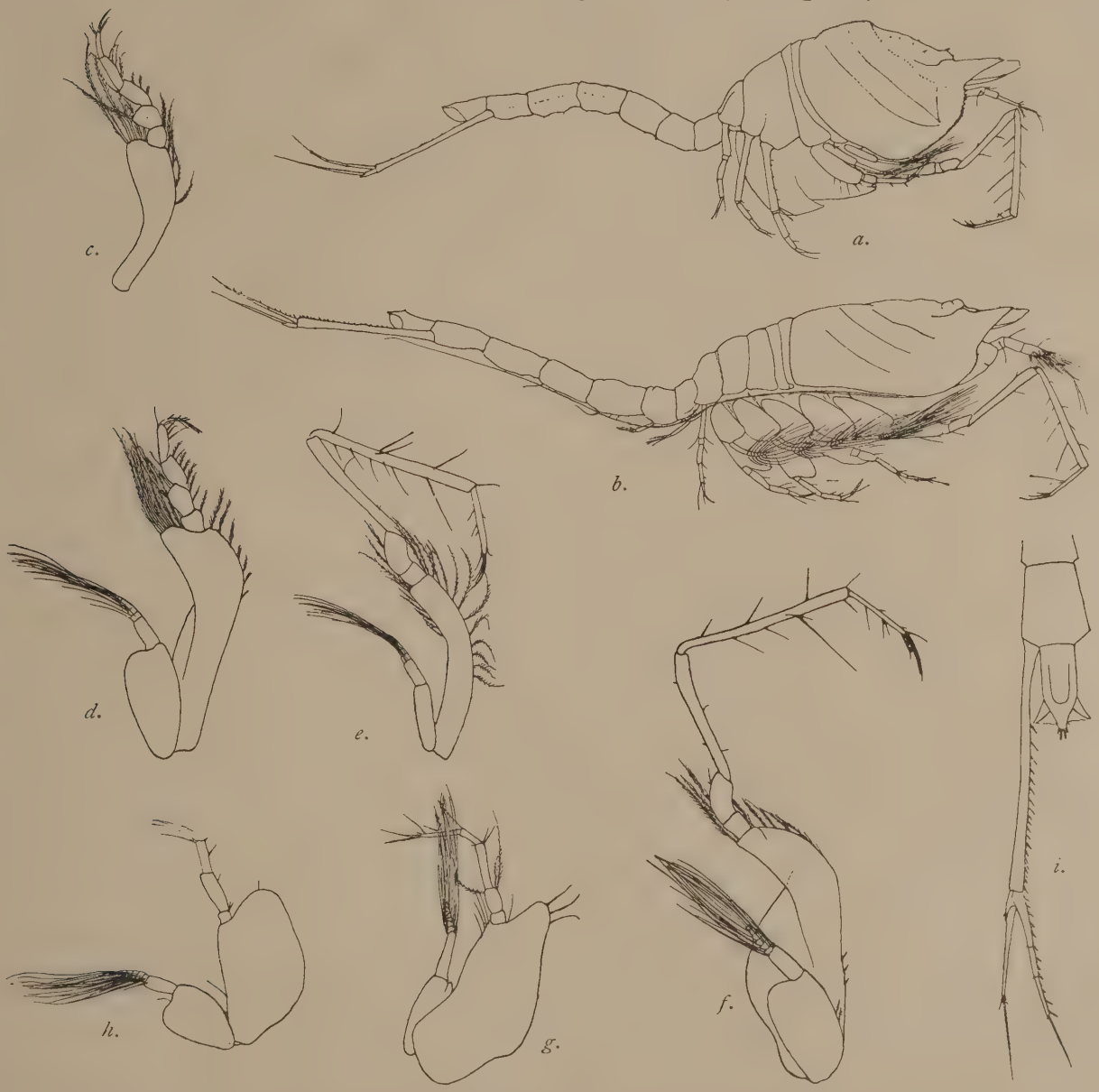

Fig. 4. *Paradiastylis longipes* n. sp.
a. Adult female, from the side. *b*. Adult male, from the side. *c*. Third maxilliped of female. *d*. Third maxilliped of male. *e*. First leg of female. *f*. First leg of male. *g*. Second leg of male. *h*. Fourth leg of male. *i*. Last somite, Telson and Uropod of male.

Resembling *P. brachyura* Calm., in general form except that the abdomen is more slender. The lateral surface of the carapace has only three oblique ridges, the fourth which is very slightly marked in *P. brachyura* being here absent. There are no strong teeth on the dorsal surface, only a pair of small denticles on the ocular lobe and a few in front of the anterior oblique ridge. The paired longitudinal crests on the posterior part of the dorsal surface are finely serrated and more prominent than in *P. brachyura*, and the space between them is deeply hollowed.

The third and fourth leg-bearing somites appear to be fused or, at least, the line of articulation between them is very slightly marked. In *P. brachyura* it is much more distinct.

The lateral serrations on the abdominal somites are larger and more numerous than in *P. brachyura*.

The telson resembles that of *P. brachyura* in size and shape. It has a pair of very small apical spinules and two pairs of minute lateral setæ.

The antennules have the third segment of the peduncle longer and more slender than in *P. brachyura*.

The third maxillipeds (text-fig. 4*c*.) have the basis narrower than in *P. brachyura*. As in that species they have no exopod.

The first legs (text-fig. 4*e*.) are much longer than in *P. brachyura*, extending beyond the tip of the pseudorostrum for a distance almost equal to the length of the carapace. The distal segments are much more slender and the propodus is relatively a little longer. The exopod is distinctly shorter than the basis. The remaining legs are more slender than in *P. brachyura*. The uropods are longer and more slender, the peduncle being three times as long as the sixth abdominal somite and bearing about eleven spines on its inner edge. The rami have about the same ratio to the peduncle as in *P. brachyura* but are slightly more unequal. The three segments of the endopod bear each a single spine on the inner edge.

Adult male. Total length 3,5 mm. (text-fig. 4*b*.).

The carapace is less deep than in the female with the dorsal surface much less strongly arched as seen from the side. The posterior part of the dorsal surface is a little depressed in the middle line between the slightly inflated branchial regions. There are three oblique ridges on each side, less strongly marked than in the female. The broad ocular lobe bears three large, strongly convex, transparent but ill-defined corneal lenses.

The fourth and fifth leg-bearing somites are quite distinct. The lateral angles of the last thoracic somite are very slightly produced, bluntly pointed as seen from the side, rounded as seen from above. The abdominal somites are quite smooth. The telson (text-fig. 4*i*.) has on the dorsal surface a flattened area defined by a *U*-shaped ridge. The pre-anal portion is sub-cylindrical and relatively longer than in the female. Close to the pair of small apical spines on each side is a smaller lateral spine and a little way from this a minute seta.

The antennules have the distal segment of the peduncle enlarged and carrying a brush of fine sensory filaments. The outer flagellum is long and slender, composed of four segments, the basal one somewhat dilated. The inner flagellum is half the length of the outer, also composed of four segments, the terminal one very minute.

The third maxillipeds (text-fig. 4*d*.) have the basis very much broader than in the female and they carry a well developed exopod.

The basal segment of all except the last pair of legs is greatly expanded on the inner side and produced beyond the articulation of the succeeding segment. In the first pair of legs (text-fig. 4*f*.) the broad lobe so formed is strongly curved inwards so that in the figure it seems to project from the outer side of the limb. The exopods of the first four pairs of legs are strongly developed, with numerous long and stout natatory setæ.

The first and second pleopods are well developed, the outer ramus of each composed of two segments.

The peduncle of the uropods (text-fig. 4*i*.) is about three times the length of the sixth abdominal somite and bears about 20 spines on its inner edge. The endopod is more, and the exopod distinctly less than half the length of the peduncle. The three segments of the endopod bear on the inner edge respectively 6, 3 and 3 spines.

Occurrence. Station 93. Plankton. Eight males and one female.
Station 142. Townet Many males and one or two females.
Station 164. One female.

Remarks. This species is very closely allied to *P. brachyura* but appears to be sufficiently distinguished by the long and slender first pair of legs and by other characters. As is indicated above some if not all the specimens in the present collection were taken by the townet and the membranous integument and strongly developed swimming organs of both species seem to indicate that they are adopted for a partially pelagic life.

Diastylopsis.

Diastylopsis (?) sp.

A single very imperfect female specimen from Station 241 probably belongs to an undescribed species but as the carapace is nearly destroyed I do not venture to describe it. In having the third and fourth leg-bearing somites apparently fused and the limbs of these somites carrying minute exopods, it agrees with the *Diastylopsis* (?) *dubia* of Bonnier (Ann. Univ. Lyon, XXVI, Campagne du Caudan, p. 559), a species of which the affinities are very uncertain.

EXPLANATION OF THE PLATES

PLATE I.

Fig. 1. *Cyclaspis persculpta* n. sp., young Female, from the side.
Fig. 2. *Cyclaspis persculpta* n. sp., from above.
Fig. 3. *Cyclaspis persculpta* n. sp., last somite and Uropod.
Fig. 4. *Cyclaspis Sibogæ* n. sp., young Female, from the side.
Fig. 5. *Cyclaspis Sibogæ* n. sp., from above.
Fig. 6. *Cyclaspis Sibogæ* n. sp., first leg.
Fig. 7. *Heterocuma Weberi* n. sp., Male, from the side.
Fig. 8. *Heterocuma Weberi* n. sp., from above.
Fig. 9. *Heterocuma Weberi* n. sp., distal part of Antennule. The very long sensory filaments of the external flagellum have only the basal portion drawn.
Fig. 10. *Heterocuma Weberi* n. sp., third Maxilliped.
Fig. 11. *Heterocuma Weberi* n. sp., first leg.
Fig. 12. *Heterocuma Weberi* n. sp., last somite and Uropod.

P. W. M. Trap impr.

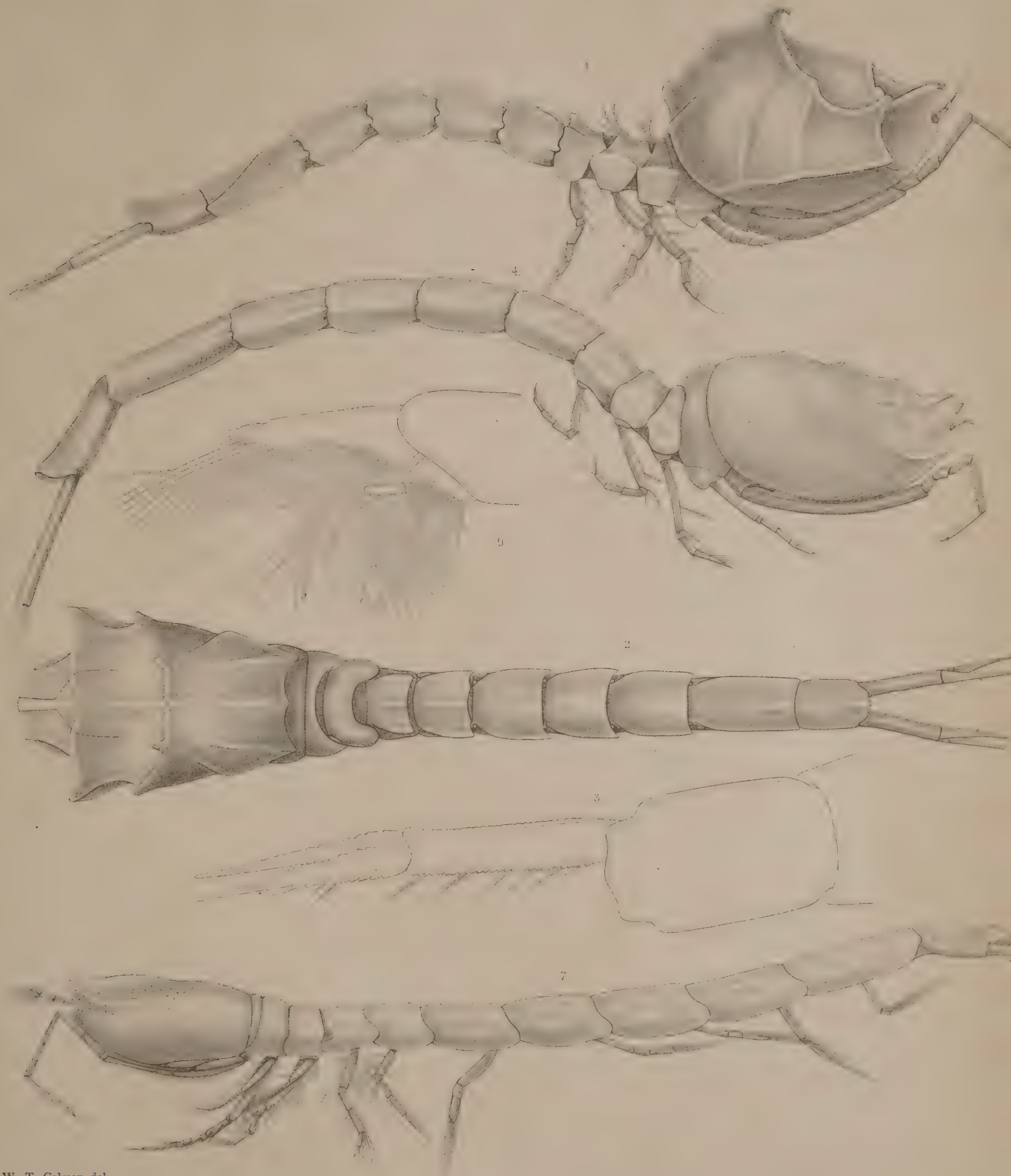

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PLATE II.

Fig. 13. *Bathycuma longirostris* n. sp., young Male, from the side.
Fig. 14. *Bathycuma longirostris* n. sp., last somite and Uropod.
Fig. 15. *Pseudodiastylis ferox* n. sp., young Female, from the side.
Fig. 16. *Pseudodiastylis ferox* n. sp., from above.
Fig. 17. *Pseudodiastylis ferox* n. sp., antero-lateral corner of carapace and terminal segment of antenna.
Fig. 18. *Pseudodiastylis ferox* n. sp., Spines on surface of carapace.
a. From anterior dorsal region. *b*. From anterior lateral region.
c. From posterior dorsal region.
Fig. 19. *Pseudodiastylis ferox* n. sp., Antennule.
a. inner Flagellum, further enlarged.
Fig. 20. *Pseudodiastylis ferox* n. sp., third Maxilliped.
Fig. 21. *Pseudodiastylis ferox* n. sp., first leg.
Fig. 22. *Pseudodiastylis ferox* n. sp., second leg.
Fig. 23. *Pseudodiastylis ferox* n. sp., fourth Leg. *Exopod.
a. exopod, further enlarged.
Fig. 24. *Pseudodiastylis ferox* n. sp., fifth Leg.
Fig. 25. *Pseudodiastylis ferox* n. sp., Telson.
Fig. 26. *Diastylis cingulatus* n. sp., young Male, from the side.
Fig. 27. *Diastylis cingulatus* n. sp., Carapace, from above.
Fig. 28. *Diastylis cingulatus* n. sp., Unciform spines on Carapace.
Fig. 29. *Diastylis cingulatus* n. sp., Last somite, Telson and Uropod.

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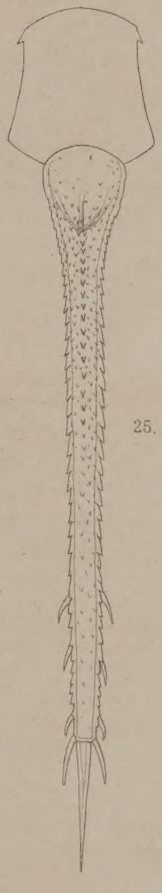
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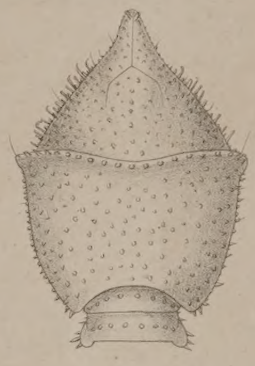
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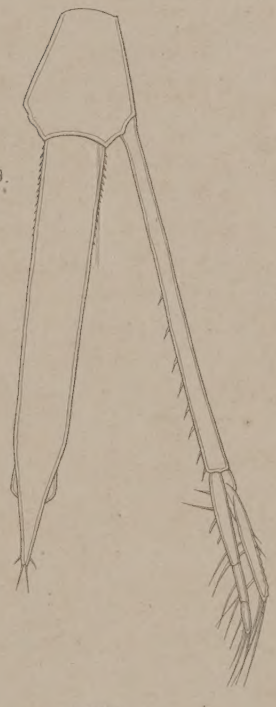
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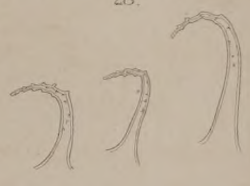
23a.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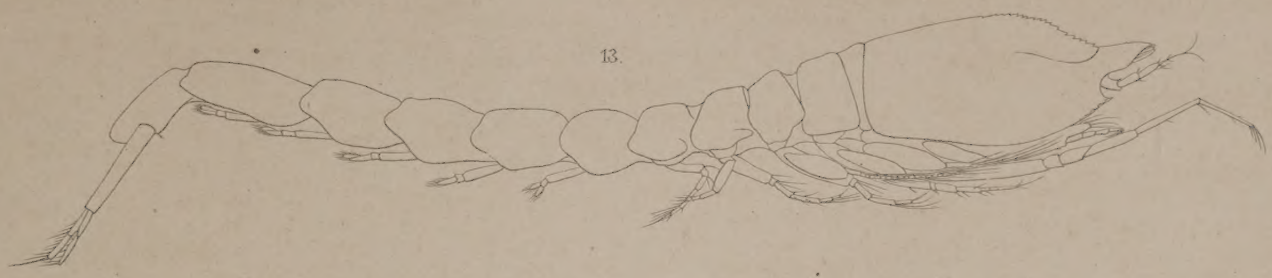

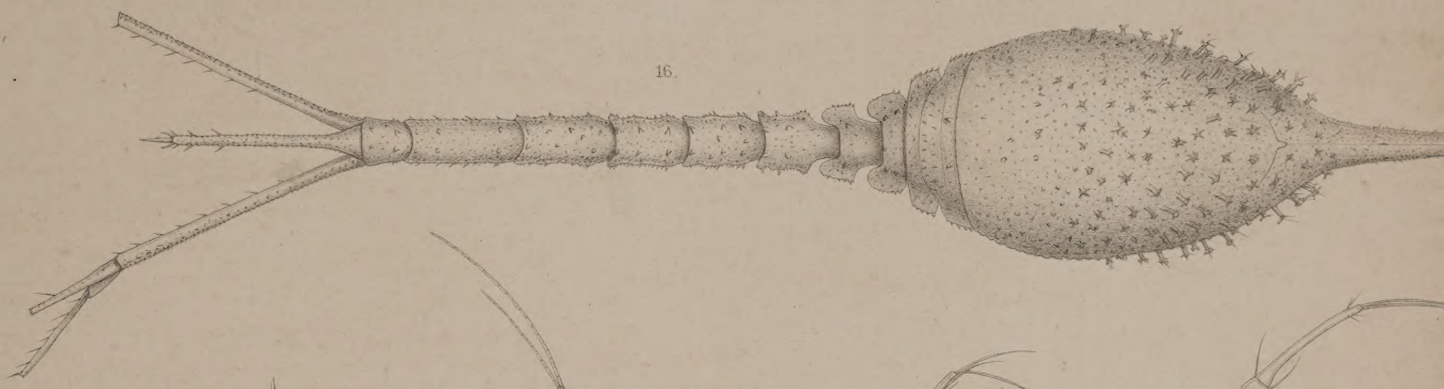

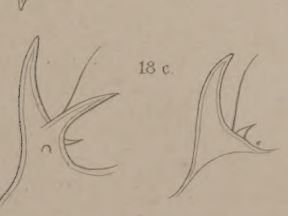

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